## Marine Fisheries Advisory Committee

# Recovery Actions Retrospective Analysis

**February 3, 2016**

## Introduction

Recovery and conservation of endangered and threatened species is important to foster healthy and sustainable marine resources, habitats, and ecosystems and is a NOAA Fisheries' primary mandate under the Endangered Species Act (ESA). Yet many times, efforts aimed at recovery fall short of their goals and are incomplete. This can be the result of recovery actions that are not well focused or not feasible. This can also be due to a lack of partnering with key stakeholders, states, tribal nations, and agencies that can influence recovery actions. The Department of Commerce Strategic Plan recognized this second shortcoming and called for NOAA Fisheries to increase collaboration in recovery efforts. Without completing the necessary recovery actions, criteria for recovery are often not met and consideration to down or de-list is delayed.

The ESA section 4(a)(1) requires NOAA Fisheries to determine whether any species is endangered or threatened due to any one or a combination of the following five threat factors: the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; or other natural or manmade factors affecting its continued existence. The ESA also requires NOAA Fisheries to use all methods and procedures to bring listed species to the point where the protections of the ESA are no longer necessary. Section 4(f) of the ESA requires the Secretary to develop and implement recovery plans for the conservation and survival of endangered and threatened species, unless such plan would not promote the conservation of the species. Recovery plans must include objective, measurable criteria which, when met, would lead to a determination that the species be removed from the list.

Recovery criteria should address the biological and ecological needs of the species, but also must address threats to the species in terms of each of the five threat factors under section 4(a)(1). Recovery plans also include site-specific management actions (*i.e.*, recovery actions) necessary to achieve the plan's goal for the conservation of the species. Recovery actions are prioritized in compliance with NMFS' Endangered and Threatened Species Listing and Recovery Priority Guidelines (55 FR 24296) as follows:

- **Priority 1:** Actions that must be taken to prevent extinction or to prevent the species from declining irreversibly.
- **Priority 2:** Actions that must be taken to prevent a significant decline in species population/habitat quality or in some other significant negative impact short of extinction.
- **Priority 3:** All other actions necessary to provide for full recovery of the species.

Finally, recovery plans include estimates of the time and costs to carry out the measures identified in the plan.

The Government Performance Improvement Act Program-Level Performance Measure requires NOAA Fisheries to track progress of ongoing or completed recovery actions (including Priority 1 actions needed to prevent extinction) included in NMFS approved recovery plans for species listed as threatened or endangered under the ESA. Recovery actions may include items that can be completed over short time periods or other actions, including monitoring, that may take many years to complete or that may be ongoing. Recovery of threatened or endangered species is a gradual process that can take decades, and completed recovery actions can show incremental progress made in achieving recovery.

The Marine Fisheries Advisory Committee (MAFAC) holds a unique position with its broad membership across multiple stakeholder groups including industry, academia, nongovernmental organizations, and tribal nations. MAFAC was asked by NOAA Fisheries Leadership to draw on member expertise and other sources to assess how the agency could improve the recovery of listed species. MAFAC's Protected Resources Subcommittee was tasked with examining recovery actions by status category (not started, ongoing, complete, etc.; see Appendix A) to identify characteristics that may increase the likelihood of recovery action success and help inform development of future recovery actions. In a subset of recovery plans, MAFAC would review the 'not started' recovery actions, with an emphasis on recovery actions related to fisheries impacts, and suggest potential partners, strategies, revisions, and clarifications to help implement these recovery actions.

MAFAC's strategy for completing this work was outlined in a Terms of Reference (Appendix B). This draft report describes the results of the work conducted to address the first of the two objectives contained in the Terms of Reference for this project. Specifically:

1. Charge its Protected Resources Subcommittee to conduct a retrospective analysis of a subset of recovery actions by status category ('not started,' 'ongoing,' 'complete') to identify characteristics that may increase the likelihood of success and help inform development of future recovery actions.

    - The initial analysis will examine the recovery actions in at least 6 recovery plans that represent the range of NMFS recovery plans. The analysis will characterize the recovery actions in each category, looking for commonalities that could inform future recovery actions.
    - The outcome of the analysis will be to provide guidance to recovery teams to define the characteristics of successful recovery actions.
    - The subcommittee will work closely with Protected Resources staff in the regions.

**MAFAC and NMFS Staff Participants**

These MAFAC Protected Resources Subcommittee members participated in the project: Ted Ames, Terri Lei Beideman, Heather Brandon, Columbus Brown, Paul Clampitt, Julie Morris, and Pam Yochem. Heidi Lovett, NMFS Office of Policy, and Therese Conant, NMFS Office of Protected Resources, provided key staff support. Also from the NMFS Office of Policy, Joshua

Gange took notes during several interviews and Rachel Demma provided an initial meta-analysis of the status of recovery actions. The Protected Resources Recovery Coordinators for the seven recovery plans that were assessed provided the key insights to inform this report: Nora Berwick, Adam Brame, Charles Littnan, Melissa Neuman, Shelley Norton, Stacie Robinson, Lisa Rotterman, Greg Silber, Rachel Sprague, and Barb Zoodsma.

**Methods of Choosing of Recovery Plans and Recovery Actions for Focused Interviews**

We tried two methods to select a representative sample of recovery actions for analysis. First we pulled a random sample of recovery actions from all recovery plans and concluded the sample was not representative. Over 70% of all recovery actions coordinated by NMFS are Pacific Salmon recovery actions, and each random sample was overwhelmingly dominated by Pacific Salmon. The second method used these four criteria to select seven representative recovery plans for analysis:

- ***Selected recovery plans are older than 12 months and represent a wide range of completion dates*.** NMFS does not anticipate recovery actions to be completed within the first year of finalizing a recovery plan. NMFS also does not report on the status of recovery actions that are less than 12 months old under their Government Performance Results Act Program-Level Performance Measure. Selecting a wide range of dates since completion will allow review of recovery actions in varying stages.
- ***Selected recovery plans are not jointly managed with U.S. Fish & Wildlife Service (FWS) or States.*** NMFS would need to seek FWS and/or State concurrence and input on the need for the review and willingness to participate in the review process, which may slow the review process.
- ***Selected recovery plans represent diverse taxa and ecological niches*.** Selecting a diverse taxa and ecosystem will allow for review of a broad range of recovery actions and partners responsible for those actions
- ***Selected recovery plans represent all NMFS regions*.** Selecting recovery plans from all regions and headquarters will allow for review of recovery actions developed across various NMFS program offices to capture possible differences in approaches to recovery plans.

These criteria were reviewed by the Protected Resources Subcommittee and accepted. Seven recovery plans were selected that met all four criteria. A quick description of each of the seven recovery species/population includes their habitat, recovery region, the age of the recovery plan, and the number of recovery actions contained in each plan.

1. ***Hawaiian monk seal.*** Mammal pinniped that inhabits warm subtropical waters surrounding atolls, islands, and areas farther offshore on reefs and submerged banks in the Hawaiian Islands. Monk seals are also found using deep water coral beds as foraging habitat. When on land, monk seals breed and haul-out on sand, corals, and volcanic rock. Sandy, protected beaches surrounded by shallow waters are preferred when pupping. Monk seals are often seen resting on beaches during the day. NMFS Pacific Islands Region. Recovery plan completed in 2007. 109 Recovery Actions.
2. ***Middle Columbia River steelhead trout, Washington Gorge Unit.*** Anadromous fish with adults spawning in freshwater and juveniles rearing in freshwater before migrating

to the ocean to grow and sexually mature prior to returning as adults to reproduce in freshwater. The spawning range of the 20 Middle Columbia River steelhead populations covers approximately 35,000 square miles of the Columbia River Plateau in south-central Washington and north-central Oregon. NMFS West Coast Region. Recovery Plan completed in 2013. Numerous recovery actions—focus was narrowed down to a biographic population group.

3. ***North Atlantic right whale.*** Mammal cetacean that occurs in the Atlantic Ocean, particularly between 20° and 60° latitude. The majority of the western North Atlantic population range from wintering and calving areas in coastal waters off the southeastern United States to summer feeding and nursery grounds in New England waters and north to the Bay of Fundy and Scotian Shelf. NMFS Greater Atlantic Region. Recovery plan completed in 2005. 154 Recovery Actions.

4. ***Smalltooth sawfish*.** Elasmobranch that inhabits shallow coastal waters of tropical seas and estuaries throughout the world. They are usually found in shallow waters (less than 32 feet (10 m)), very close to shore over muddy and sandy bottoms. They are often found in sheltered bays, on shallow banks, and in estuaries or river mouths. In the U.S., smalltooth sawfish are found in the peninsula of Florida, common only in the Everglades region at the southern tip of the state. NMFS Southeast Region. Recovery plan completed in 2009. 98 Recovery Actions.

5. ***Sperm whale*.** Mammal cetacean that inhabits all oceans of the world. They can be seen close to the edge of pack ice in both hemispheres and are also common along the equator, especially in the Pacific. Sperm whales are found throughout the world's oceans in deep waters between about 60° N and 60° S latitudes. NMFS Headquarters. Recovery Plan completed in 2010. 64 Recovery Actions.

6. ***Steller sea lion Western Distinct Population Segment (DPS).*** Mammal pinniped that inhabits colder temperate to sub-arctic waters of the North Pacific Ocean. Haul outs and rookeries usually occur on rocks, remote islands, beaches (gravel, rocky or sand), ledges, and rocky reefs. Steller sea lions forage in a variety of marine habitats including benthic and pelagic habitats, rivers, nearshore, continental shelf and slope, and in oceanic zones. Western DPS animals regularly occur along the North Pacific Ocean rim from northern Hokkaiddo, Japan through the Kuril Islands and Okhotsk Sea; Aleutian Islands; central and northern Bering Sea; and northern parts of Southeast Alaska. Eastern DPS Steller sea lions (delisted) utilize parts of the range of the Western DPS but breed on rookeries from California through Southeast Alaska. NMFS Alaska Region. Recovery plan completed in 2008. 82 Recovery Actions.

7. ***White abalone***. Invertebrate mollusk occurs in open low and high relief rock or boulder habitat that is interspersed with sand channels usually at depths of 80-100 feet (25-30 m). Distributed in southern California through Baja Peninsula. NMFS West Coast Region. Recovery plan completed in 2008. 27 Recovery Actions.

With seven plans identified, we considered the logistics and methods of analysis. We chose a qualitative method based on interviews with the recovery coordinator for each plan. The subcommittee developed an interview guide (Table 1) and a template for organizing the notes from the interview.

Table 1. Interview Guide.

| |
|---|
| Is the recovery action described clearly and in enough detail that you know who, what, when, where, how the action will be completed? |
| Does the recovery action overlap with actions to recovery other protected species and, if so, does this overlap affect the outcome? |
| Is the recovery action linked to other actions that must occur and is it apparent and clear the sequence that is needed and are responsible parties aware of the link and are they coordinating efforts? |
| Is the recovery action appropriately linked to the recovery criteria (biological or threats) and does that affect the outcome (*i.e*., does it actually contribute to recovery or should it be categorized as Obsolete)? |
| Is the lead responsible party reported to and coordinated with a broader group of responsible parties? |
| Does the recovery action depend on other agencies for implementation, and if so, how does this affect the outcome? |
| Did the party (ies) responsible for the recovery action help identify and develop the recovery action during recovery plan development and did that affect the outcome? |
| Did NMFS reach out and coordinate with responsible party (ies) after finalizing the recovery plan and did the level of coordination affect the outcome? |
| Do the Priority 1-3 numbers assigned appropriately reflect the priority for the recovery action? Are the top priorities funded/ completed first or are the easiest actions completed first? |
| Are there any other factors the coordinator feels contributes to or hinders effective recovery of the species? |

Therese Conant convened a conference call for the recovery coordinators to explain the overall goal of the recovery action analysis and the interview process. Heidi Lovett convened a conference call for the Protected Resources Subcommittee members to organize a schedule for the interviews to be conducted during July and August, with a lead interviewer, a second MAFAC participant, and a NMFS staff member taking notes (Table 2).

The interviews were scheduled to last 90 minutes. It became obvious that we would need to identify a subset of the recovery actions in each recovery plan for the interview discussion. Five recovery plans contained 80-150 recovery actions each, and the other two had 47 recovery actions (white abalone) and 196 recovery actions (steelhead trout). In order to focus the analysis, we chose a subset of 10-25 recovery actions for discussion in each interview. In two interviews, the rich, detailed conversations allowed discussion of fewer than 10 recovery actions.

Each MAFAC lead interviewer drafted a summary of the interview, providing an overview as well as comments on the interview guide questions for each recovery action (overviews are provided in Appendix C). This was accompanied by a spreadsheet that reported "yes, partially yes/no, no or NA" to each interview question for each recovery action discussed. The recovery actions discussed in the interviews were sorted by their status (Completed, Partially Completed, Ongoing Current, Ongoing Not Current, Not Started). For each status category, charts were prepared showing the responses to three key questions:

- Is the recovery action appropriately linked to the recovery criteria (biological or threats) and does that affect the outcome?

- Does the recovery action depend on other agencies for implementation, and if so, how does this affect the outcome?
- Did the party (ies) responsible for the recovery action help identify and develop the recovery action during recovery plan development?

Table 2. Dates of each interview and the participants.

| SPECIES | Recovery Coordinator | Interview Date | MAFAC Lead | 2nd MAFAC Participant | NMFS Staff |
|---|---|---|---|---|---|
| Hawaiian monk seal | Rachel Sprague, Stacie Robinson, Charles Littnan | 7/31/15 | Pam Yochem | Terri Beideman | Heidi Lovett |
| Middle-Columbia River steelhead trout | Nora Berwick | 7/17/15 | Julie Morris | Liz Hamilton | Heidi Lovett |
| North Atlantic right whale | Barb Zoodsma | 7/30/15 | Ted Ames | Paul Clampitt | Heidi Lovett |
| Smalltooth sawfish | Adam Brame, Shelley Norton | 7/7/15 | Columbus Brown | Julie Morris | Heidi Lovett |
| Sperm whale | Greg Silbur | 8/7/15 | Paul Clampitt | Ted Ames | Joshua Gange |
| Steller sea lion, Western DPS | Lisa Rotterman | 7/22/15 | Heather Brandon | Paul Clampitt | Joshua Gange |
| White abalone | Melissa Neuman | 7/27/15 | Terri Lei Beideman | Pam Yochem | Heidi Lovett |

## Positive and Negative Factors Affecting Recovery Actions from Interviews with Recovery Coordinators

### ***Cross-Cutting Positive Factors***

Five of the seven recovery plans have developed stable, well-functioning and inclusive teams to move recovery actions forward. Five of seven recovery plans are undergoing, or planning to undergo, updates to review recovery actions and set new priorities based on advances in science and management knowledge. Management actions already implemented to reduce fishing and vessel interactions and protect habitat have improved recovery for five of the seven species.

Table 3. Cross cutting positive factors from interviews (codes are: Hawaiian monk seal, HMS; Middle Columbia River steelhead trout, MCRST; North Atlantic right whale, NARW; smalltooth sawfish, SS; sperm whale, SW; Steller sea lion, SSL; and white abalone, WA.)

| Cross Cutting Positive Factors from Interviews | HMS | MCRST | NARW | SS | SW | SSL | WA |
|---|---|---|---|---|---|---|---|
| Recovery Actions undergoing/plan to undergo updates: adding measurable outcomes and reviewing priorities. | X | X | X | X | | X | |
| Management actions to restrict fishing or vessel impacts or protect habitat have had a positive effect on recovery. | X | | X | | X | X | X |
| A stable, well-functioning, inclusive team coordinates recovery actions and research. | X | X | X | X | | X | |
| Improved data collection technology is providing better data on range and movement. | X | | X | X | | X | X |
| Section 6 Cooperative Agreements and research partnerships with states support recovery action success. | X | | | X | | X | X |
| Co-management with native entities. | | X | | | | X | |

***Key Positive Factors***

For several species, recovery actions are either undergoing or planning to undergo updates. These updates add measurable outcomes and revise priorities in light of new information about limiting factors and the actions that are most likely to affect recovery criteria. For example, for the Middle Columbia Washington Gorge steelhead trout recovery actions are being reassessed and reprioritized in light of better information and science about limiting factors and recovery criteria. A steering committee has been established to reprioritize recovery actions. Five year reviews of the species status, including progress of recovery actions, present an important opportunity to flag originally-identified recovery actions that are no longer considered to be linked to meaningful or desirable recovery outcomes.

For several species, recovery coordinators noted that other resource management activities, in addition to improved data collection, had a positive outcome for a species and have overtaken the need to implement some recovery actions, caused them to become obsolete, or provided an opportunity for the focus of recovery work to shift. It is thus important to update recovery plan actions, or their implementation plans, to allow for this as well. One clear example was the impact that the designation of the Papahānaumokuākea Marine National Monument had, which encompassed the Northwest Hawaiian Islands (NWHI). Designation occurred just before the recovery plan was finalized, and before actions got underway. Longline fisheries were once a problem for Hawaiian monk seals in the NWHI, but monument designation closed the region to these activities. With no major fishing activities, several actions are no longer significant. For example, it is not necessary to "investigate competition with … commercial and recreational fisheries in the NWHI," although this action should continue in the main Hawaiian Islands, where fishing is primarily managed by the state of Hawaii. Other examples are the International Whaling Commission's prohibition on the commercial harvest of sperm whales which allowed populations to stabilize. Thus, the recovery action was based on continued coordination with the International Whaling Commission to ensure direct harvest is at a sustainable level. Habitat protected in marine protected areas along the California coast has also provided habitat protection for many populations of white abalone, but coastal development and factors that affect water and kelp quality (*e.g.*, oil spills, increases in sea surface temperature due to long- and short-term climate events) can lead to less resilient kelp forests.

Newly available technology to assess sperm whale and North Atlantic right whale movements is allowing stalled recovery actions to move forward. Previously, satellite tags attached to North Atlantic right whales caused tissue damage and threatened the health of tagged whales. New active and passive acoustic devices are helping researchers understand distribution and migration routes for North Atlantic right whales. Better drugging protocols, capture protocols, and telemetry devices have facilitated study of adult female Steller sea lions habitat use. Recently, the use of unmanned aircraft has improved the ability of researchers to obtain regular counts of Steller sea lions in parts of the Aleutian Islands with particularly challenging weather.

A strong interagency team and a process that includes stakeholders is a positive factor in completing recovery actions. For the North Atlantic right whale, NMFS coordinated with Canada, the fisheries councils, and State agencies to develop new regulations through discussions with informed stakeholders. It appears that the level of coordination occurring

among agencies has greatly improved compliance with regulatory changes and improved outcomes for the whales.

When a motivated and responsible party has adequate funding to implement an infrastructure recovery action, the action can move forward. For example, the Middle Columbia River, Washington Gorge steelhead trout plan includes an action to soften and relocate floodplain infrastructure along the Klickitat River. This was a priority for the Yakima Nation and funding was provided by the Bonneville Power Authority. Great progress has been made on removing an old haul road and restoring shoreline habitat for steelhead trout.

***Cross Cutting Negative Factors***

Funding and staffing levels are below what is required for successful recovery actions in six of seven recovery plans, and future funding is uncertain. Data on behavior, distribution, limiting factors, reproduction, nursery habitat, and genetics limits implementation of recovery actions in six of seven recovery plans, and field work to collect these data is curtailed. Jurisdictional issues and conflicts among federal agencies interfere with recovery action progress in five of the seven recovery plans. Five of the seven recovery plans contain recovery actions that are not linked to limiting factors for the species or measurable recovery criteria.

Table 4. Cross Cutting Negative Factors from Interviews.

| **Cross Cutting Negative Factors from Interviews** | HMS | MCRST | NARW | SS | SW | SSL | WA |
|---|---|---|---|---|---|---|---|
| Jurisdictional issues (access, permits), conflicts among federal agencies, and disagreements among state government entities interfere with recovery action implementation. | x | x | | x | | x | x |
| Funding and staffing levels are below what is required for recovery action success. Future funding is uncertain undermining planning. | x | x | | x | x | x | x |
| Many recovery actions were not linked to limiting factors or measurable recovery criteria and are no longer a priority. Some actions are now outdated due to advances in science and management. | x | x | x | x | x | | |
| Data on behavior, distribution, limiting factors, reproduction, nursery habitat and genetics limits recovery actions. Field work to gather data is curtailed by reduced funding, or dangerous field conditions. | x | x | x | x | x | | x |
| When recovery action depends on cooperation of foreign governments, progress can be difficult. | | | | x | x | | x |
| When a joint mandate is lacking, NMFS staff must convince other agencies to prioritize completing assigned recovery action tasks. | x | x | | | | | |

***Key Negative Factors***

In one recovery plan, the state does not have the structure that would allow greater sharing of resources for recovery. The State of Alaska developed a document to "describe[s] how future State fishery management actions within the breeding range of the Steller sea lion eastern DPS will continue to comport with the Marine Mammal Protection Act and will continue to minimize incidental take of sea lions associated with those fisheries." A similar agreement has not been developed for fisheries within the breeding range of the Steller sea lion western DPS. Some

State fisheries with a history of documented take of Steller sea lions have not been monitored in decades, and NMFS and the State have not actively identified steps to mitigate and minimize this take. A Habitat Conservation Plan would foster recovery of the Steller sea lion western DPS by ensuring that anticipated take of the listed species is effectively minimized or mitigated. Regular monitoring of State fisheries using observer programs would reduce uncertainty about take and fishery impact and foster recovery. In a second instance, even though Hawaii has received ESA section 6 grants, it lacks a wildlife program that is dedicated solely to marine species. Additionally, Hawaii has focused on education and outreach with fishermen, emphasizing the use of barbless circle hooks as preferred gear. However, substantially reducing or eliminating the fishing interactions in the first place would be a more direct way to support recovery.

Sequencing of recovery actions presented problems in recovery plans. In the Washington Gorge Unit, removal of the Conduit Dam was a recovery action for steelhead trout. Pacific Corp was responsible for pre-dam removal baseline studies and removal of the dam which were accomplished in a timely manner. But there is no lead responsible party for the post removal monitoring. Salmon and trout are returning to the White Salmon River in response to the dam removal, but there is no research to document their return and describe how river habitat is changing.

Research is paramount, particularly for data poor species. Improved information allows recovery teams to better focus their limited budgets and staff resources to those actions which can have the largest positive impacts. Additionally, when staff are writing a recovery plan for the first time, and there is not a lot of information, an action that can sound good in theory can turn out to be unrealistic or not make sense later. In several recovery plans, for example the Steller sea lion, additional data are needed regarding contaminants and other disease-causing agents before modeling to determine the effect of that potentially limiting factor can be done. Lack of time, data, funding, and staffing also confounds the ability to develop population models for white abalone.

When a population spans international borders or includes international waters, foreign governments and international agencies are key players in recovery, but coordination outside the U.S. can be difficult. It would be helpful to characterize sperm whale habitat in the Mediterranean, but this depends on participation of foreign governments, which has not been forthcoming. The habitat conditions in Mexico for white abalone are uncertain. So far, Mexico has not participated in a technical advisory team to coordinate white abalone recovery on both sides of the border. By comparison, there is good cooperation and communication on Steller sea lion research and monitoring efforts between NMFS researchers and managers and Russian and Canadian scientists.

Various bottlenecks in obtaining research permits prolong the accomplishment of priority recovery actions. This is especially true for data poor species and situations where other protected species or their critical/essential habitats may be affected. It is not uncommon for research permits to take a year or longer for approval, revision, or renewal. Common sources of bottlenecks include the need to comply with various overlapping international, federal, and state laws; funding; and policies of institutions that support the scientists doing the research. It is essential that recovery plans identify and justify the scope of actions that require research permits

(including number of specimens that need to be harvested from the wild, examined, and released back into the wild—with or without tags); involve the parties that must concur in conducting research; and identify adequate funding sources to accomplish the work once the research permit is authorized. Additionally, animal welfare issues, advancements in technology, and data analyses have led to a need to modify or eliminate actions that were previously considered as high priority in recovery plans. These issues were especially noted for the smallmouth sawfish, white abalone, Hawaiian monk seal, and the North Atlantic right whale.

Limited funding and staff time prevent the implementation of many recovery actions. For example, NMFS is unable to assess how climate change and contamination are affecting sperm whales. Likewise, recovery efforts for Hawaiian monk seals need information on prey availability and the impact of oceanographic changes, but obtaining this information is cost prohibitive.

Some recovery actions are not well linked to limiting factors for species recovery and should not be implemented. One recovery action for Middle Columbia River, Washington Gorge steelhead trout calls for placing carcasses in the Klickitat River to fertilize the stream (add nutrients). The recovery team determined that placing carcasses would actually degrade the stream habitat for steelhead trout, the action is "not started," and should be obsolete. A white abalone recovery action calls for maintaining rockfish conservation areas but is no longer a priority, since abalone habitat does not overlap with rockfish conservation areas in most cases.

If there are jurisdictional issues or disputes over the importance of some actions, and a permit is required to complete an action, species recovery can be significantly impaired. One example is seeking approval to reduce shark predation on juvenile Hawaiian monk seals in the Northwest Hawaiian Islands.

All seven of the recovery plans that were the focus of the interviews either are benefiting from, or would greatly benefit from, having a written implementation plan. Many of the sperm whale recovery actions are stated too broadly, and specific implementable recovery actions are not defined. An action to protect sperm whale habitat in all U.S. waters is not actionable.

**Excel Spreadsheet Analysis**

In addition to the qualitative notes, each interviewer scored the answers to the eight interview questions as either "yes, partially yes/no, no, or NA." This scoring was sorted by the status of the recovery action (complete, partially complete, ongoing current, ongoing not current, not started). The following charts show cumulative scoring on three key questions by status of the recovery action across all seven interviews for three key questions:

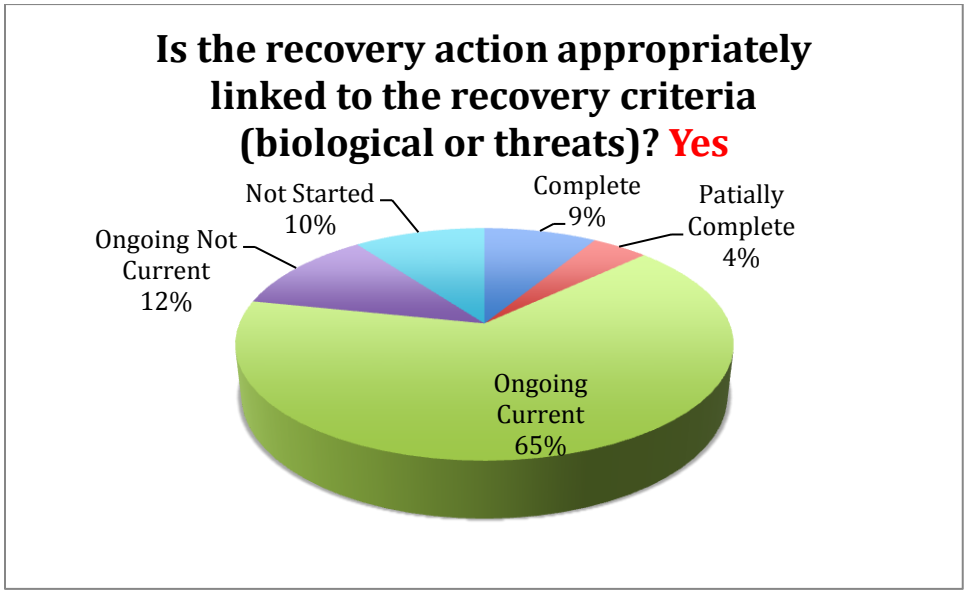
- Is the recovery action appropriately linked to the recovery criteria (biological or threats)?
- Does the recovery action depend on other agencies for implementation?
- Did the party(ies) responsible for the recovery action help identify and develop the recovery action during recovery development?

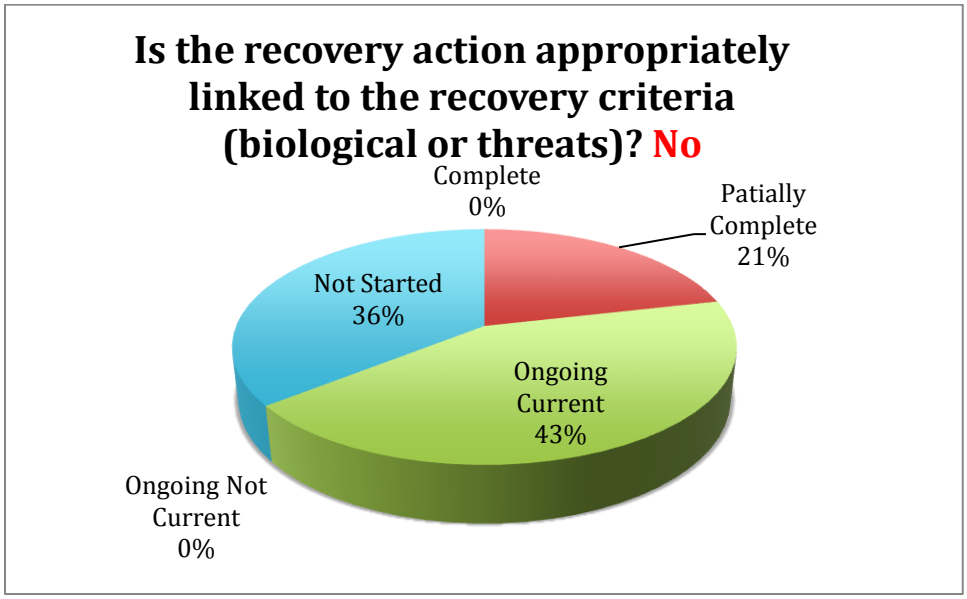
This analysis indicated that recovery actions that were *not* appropriately linked to the recovery criteria were much more likely to be in the status of "not started." Thirty six percent (36%) of

actions *not* appropriately linked to recovery criteria were "not started" compared to 10% of the actions appropriately linked being "not started." However, it is troubling that 43% of the ongoing current recovery actions were not appropriately linked to recovery criteria but continued in "ongoing current" status. A next step could be to look more closely at these actions.

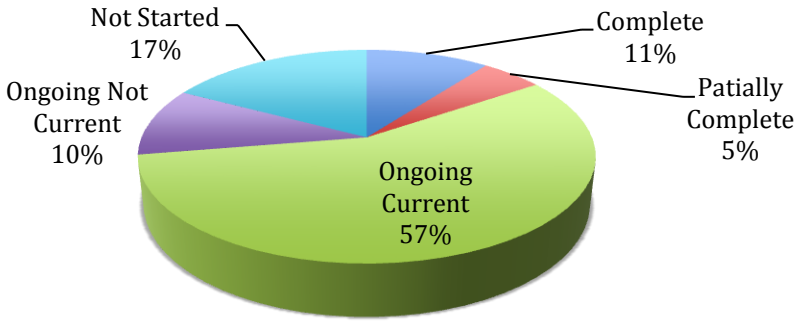
A comparison of yes vs. no answers to the other two questions did not identify notable difference in status of recovery actions.

The following pie charts illustrate the results.

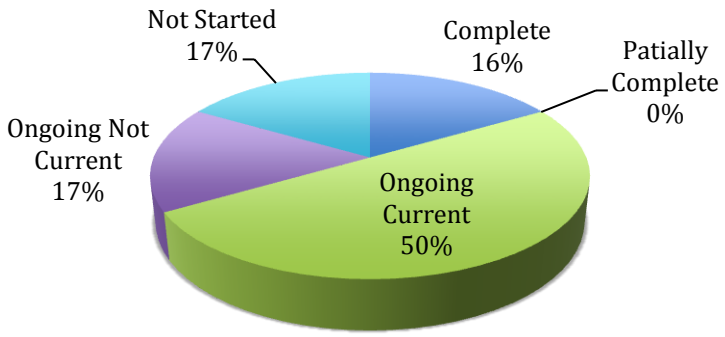


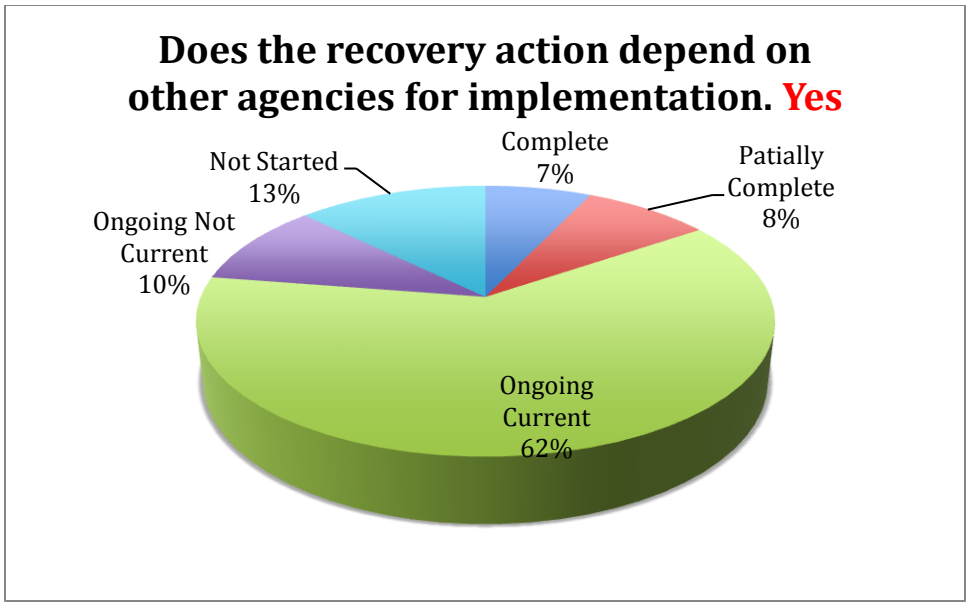



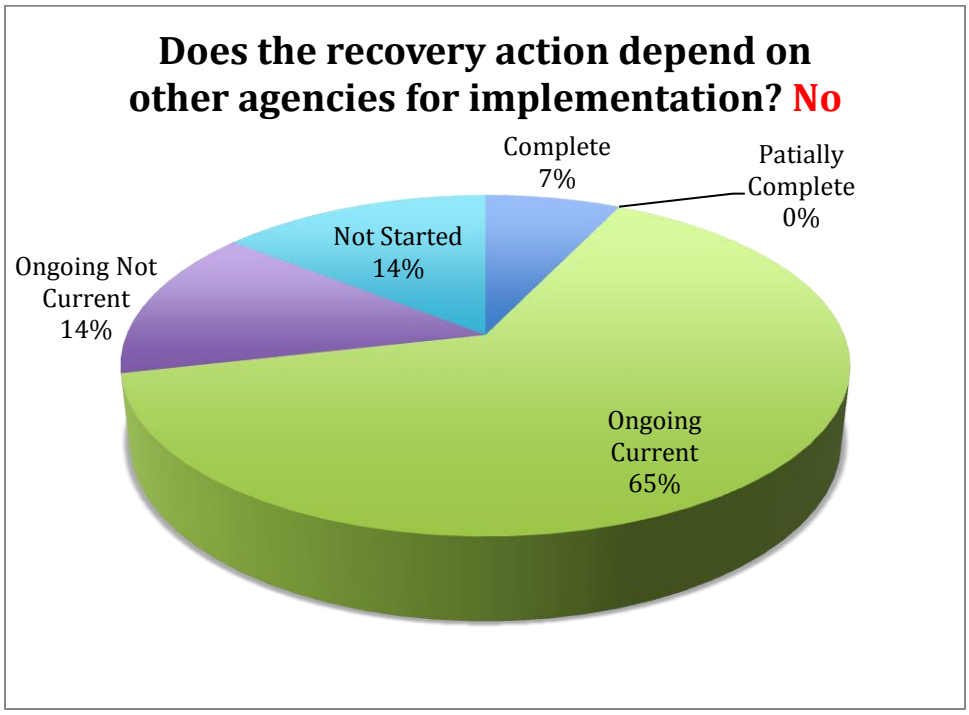
**Did the party (ies) responsible for the recovery action help identify and develop the recovery action during recovery plan development? Yes**




**Did the party (ies) responsible for the recovery action help identify and develop the recovery action during recovery plan development? No**






**Conclusions**

Structurally, creating a stable, well-functioning recovery team may be a stronger predictor of success than the characteristics of any particular recovery action.

Periodic reviews of recovery actions are also vital to success. A review allows the recovery team to refocus priority actions in light of new scientific analyses or new management tools that were not foreseen when the recovery plan was initially drafted.

New information often follows the deployment of new technology to gather range and movement data, identify key habitat areas, observe behaviors, and map genetics. A chain of sequenced actions, where each action relies on data or outcomes from a previous action, can stall if one action in the chain is incomplete.

The convergence of motivated responsible parties and adequate funding around a priority infrastructure action often results in successful completion of a recovery action.

Inadequate funding and staffing interfere with the completion of recovery actions, and uncertainty about future funding undermines recovery actions that rely on multi-year research projects or ongoing monitoring.

Initial recovery plans were sometimes written without a workable understanding of how each proposed recovery action connects with limiting factors or recovery criteria. As the recovery plan matures, the actions with a direct effect on recovery criteria come into focus and those that do not shift to lower priority. Globally, across the seven interviews, actions that were not linked to recovery criteria were more likely to be "not started." This is a sensible and strategic status for actions that are not appropriately linked to recovery criteria.

Protected species range across government boundaries. Recovery actions often are stalled by jurisdictional issues including conflicts among federal agencies, lack of cooperation between federal, state and tribal agencies, and disagreements among state government entities. Cooperation across international boundaries can be particularly difficult. When a recovery action depends on cooperation across several jurisdictions, a well-functioning recovery team with decision-making members from the key jurisdictions is invaluable.

**Epilogue**

The MAFAC Protected Resources Subcommittee observed that adaptive management approaches can help overcome many of the challenges to implementing successful recovery actions that were identified during the interviews. When the cause of decline of a threatened or endangered species population is not known or there are multiple threats, an adaptive management approach may be warranted and may shed light on solutions. Even within an endangered population, it may be possible for a portion of that population to begin recovery while another portion continues to decline. Setting up an adaptive management approach within the recovery plan may offer insight to managers regarding which management measures contribute to recovery and which do not. Through an iterative and controlled process, better science is obtained. This is especially important in light of climate change and the uncertainty it represents for what is needed to recover protected species. An adaptive management approach is consistent with NOAA Fisheries guidance for treatment of climate change in NMFS ESA decisions (January 4, 2016 Wieting to Sobeck memorandum). The guidance emphasizes adaptive management approaches should be implemented, where appropriate, to allow them to better respond to climate change effects over time. However, adaptive management elements in a recovery plan must avoid Jeopardizing the species or resulting in destruction or Adverse Modification of a species critical habitat (JAM; 50 CFR 402). Because of these concerns, it may

be wise to test adaptive management strategies on non ESA listed species prior to implementing them for threatened or endangered species.

**Appendix A:** Definitions of Recovery Action Status

**Appendix B:** Terms of Reference

**Appendix C:** Overview of Interviews for Individual Recovery Species

## Appendix A

### Definitions of Recovery Action Status

These definitions were created as Business Rules for the U.S. Fish & Wildlife Service Recovery Online Activity Reporting database, which is used by NOAA Fisheries as well.

| | |
|---|---|
| Discontinued | Action has had some work done, but is not ongoing, out-of-date or unsuccessful. Still considered necessary for recovery, but there are no current plans to resume work. |
| Complete | Action has been successfully completed. No work remains to be done. |
| Not Started | No planning or implementation work has been done. No plans in place to begin work. Still considered necessary for recovery. |
| Obsolete | This action is not necessary to recovery, according to current understanding of species' status. |
| Ongoing Current | Action duration is "ongoing" or "continuous" (i.e., actions without specified end-points that are conducted continuously or periodically throughout the recovery process, like surveys). Action is considered necessary for recovery and is currently being implemented. Further work needed to bring action to "Complete" status. |
| Ongoing Not Current | Action duration is "ongoing" or "continuous" (i.e., actions without specified end-points that are conducted continuously or periodically throughout the recovery process, like surveys). Action is still considered necessary for recovery, but is behind schedule (not current). |
| Partially Complete | Action duration has a discrete end-point (i.e., 3 years). Action has been partially completed (relative to work needed when recovery plan was released). Further work needed to bring action to "Complete" status. |
| Planned | Initial planning of action is complete or in progress, but no implementation has yet been done (relative to work needed when recovery plan was released). |
| Unknown | Status of action planning or implementation not known. |

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# Appendix B

## Marine Fisheries Advisory Committee (MAFAC)

## Endangered Species Act Recovery Project of the Protected Resources Subcommittee

## Terms of Reference
## October 2014

**Purpose**
Conduct a retrospective analysis of a subset of NOAA Fisheries Endangered Species Act recovery actions by status category ('not started,' 'ongoing,' 'complete') to identify characteristics that may increase the likelihood of recovery action success and help inform development of future recovery actions. In a subset of recovery plans, review the 'not started' recovery actions, with an emphasis on recovery actions related to fisheries impacts and suggest potential partners, strategies, revisions and clarifications to help implement these recovery actions.

**Background/Scope**
Recovery and conservation of protected resources is important to foster healthy and sustainable marine resources, habitats, and ecosystems and is a NOAA Fisheries' primary mandate under the ESA. Yet many times, recovery efforts fall short of their goals and are incomplete. This can be the result of recovery actions that are not well focused or not feasible. This can also be due to a lack of partnering with key stakeholders, tribal nations, and agencies that can influence recovery actions. The Department of Commerce Strategic Plan recognized this second shortcoming and called for NOAA Fisheries to increase collaboration in recovery efforts. Without completing the necessary recovery actions, criteria for recovery are often not met and consideration to down or de-list is delayed. MAFAC holds a unique position with its broad membership across states, industry, academia, nongovernmental organizations, and tribal nations.

**Objective**
To help NOAA Fisheries meet its ESA recovery goals, the Marine Fisheries Advisory Committee (MAFAC) will:

1. Charge its Protected Resources Subcommittee to conduct a retrospective analysis of a subset of recovery actions by status category ('not started,' 'ongoing,' 'complete') to identify characteristics that may increase the likelihood of success and help inform development of future recovery actions.

    - The initial analysis will examine the recovery actions in at least 6 recovery plans that represent the range of NMFS recovery plans. The analysis will characterize the recovery actions in each category, looking for commonalities that could inform future recovery actions.
    - The outcome of the analysis will be to provide guidance to recovery teams to define the characteristics of successful recovery actions.
    - The subcommittee will work closely with Protected Resources staff in the regions.

2. In a subset of recovery plans, the MAFAC Protected Resources Subcommittee will review the 'not started' recovery actions, with an emphasis on recovery actions related to fisheries impacts. The Subcommittee will suggest potential partners and strategies, and/ or provide revisions and clarifications to help implement these recovery actions.
    - NMFS Protected Resources will poll staff with expertise in species recovery to see if these recovery actions match their needs or whether there are other recovery actions that would benefit from the Subcommittee's expertise.
    - Based on consensus of which recovery actions the Subcommittee would assist with, the Subcommittee would work directly with the recovery coordinator and or/team(s).

**Terms and Composition**

Objective 1 will be conducted by the MAFAC Protected Resources Subcommittee with support from NOAA Fisheries protected resources staff from headquarters and regions. For Objective 2 (building partnerships and facilitating implementation of recovery actions), the MAFAC Protected Resources Subcommittee will work with NMFS protected resources recovery coordinators and recovery teams, as appropriate based upon the final list of recovery actions agreed to by the MAFAC Protected Resources Subcommittee and NOAA Fisheries. From the NOAA Fisheries side, work will be coordinated through Therese Conant from the Office of Protected Resources and Heidi Lovett from the Office of Policy.

**Organization and Reporting**

The MAFAC Protected Resources Subcommittee will meet during regular in-person meetings of MAFAC. Between meetings, work will be conducted by telephone or using other meeting technology. The Subcommittee may meet in person at other times, at the discretion of NOAA Fisheries.

The Protected Resources Subcommittee will report on its activities, findings, recommendations, reports, and other deliverables at regular meetings of MAFAC and to NOAA Fisheries Leadership. Individual members of the Subcommittee may provide feedback on specific topics that do not require consensus input, at the request of NOAA Fisheries outside of the MAFAC approval process.

**Funding**

Funding for travel and other expenses will be the joint responsibility of the Office of Policy and Office of Protected Resources.

**Duration**

The ESA Recovery Project will be the focused project work of the Protected Resources Subcommittee for one year with a possibility of extending that term if deemed necessary by NOAA Fisheries and MAFAC.

# Appendix C

## Overview of Interviews for Individual Recovery Species

***Hawaiian monk seal***

Factors contributing to the successful implementation recovery actions discussed in the interview:

- The recovery plan is well written and overall is a very effective plan. The appropriate subject matter experts were involved in the writing of the plan. There is wide confidence in the plan, that it is based on science and not politics. It has enough detail to provide clear guidance on the actions, but is not so specific that it becomes obsolete quickly or hampers the agency's ability to modify its approach as needed (except in a few instances). Plans are underway to update some of the actions (staff capacity permitting). The actions are a good mix of low-hanging fruit and more difficult but still relevant/meaningful and doable items.
- Commercial and recreational fisheries are not likely to interact with monk seals in the Northwest Hawaiian Islands (NWHI) since the establishment of the national monument, allowing NMFS to shift some focus to the Main Hawaiian Islands. The fisheries that remain are state-managed and, there are reports of seals dying from hook ingestion and entanglement in state nearshore fisheries. However there is no formal reporting and the state does not have ESA-MMPA authorization for the takes that occur in the state fisheries.
- Preventing and/or reducing the spread of infectious diseases require cooperation among many jurisdictions (federal, state, local; public health agencies as well as wildlife agencies). Coordination among groups is very good owing to good veterinarian-to-veterinarian communication and collaboration, even if other agencies (such as the state) are not listed as responsible agencies.

Factors representing a challenge to the successful implementation of recovery actions discussed in the interview:

- The creation of a National Monument in the NWHI has resulted in significant jurisdictional issues (access, place-based permitting) that are hampering some recovery efforts. Removal of problem sharks is the most serious example of this. The scientific justifications showing risk/benefit for seals vs sharks are robust and yet shark removal is a continuing source of conflict among federal agencies. Although this action only affects one monk seal colony (French Frigate Shoals), the impact of sharks on pup cohorts there is significant.
- Some actions are outdated. There have been some significant advances in science and management since it was written. Also, when written, there was more focus on the NWHI, but much has been accomplished since the establishment of the Monument. Numbers of monk seals are up in the Main Hawaiian Islands, and those actions need more attention (should be higher priority). Staff noted they are making, or planning to make these updates. Actions are funded far below ($2-4 million below) what the recovery plan requires for success. For example, it costs about $1 million just to rescue and rehabilitate injured seals with this work being done by partners and outside groups. Field

camps have been curtailed (fewer trips, shorter duration) and yet these deployments are key to data collection, population monitoring, and many direct management actions.

- Some recovery actions depend on cooperation among government entities, and disagreements among those entities sometimes delay implementation of the action. The State of Hawaii and at least two federal agencies (NMFS and USFWS) have to review and comment on every permit application related to recovery actions. In other instances, the state is an appropriate partner or responsible agency, but is not listed as such. Additionally, Hawaii conducts outreach and education to reduce fishery interactions, but lacks a more pro-active fisheries management plan to reduce fisheries interactions with monk seals.
- Hawaii does not have a strong NGO community to assist with recovery actions, though there are a few notable exceptions (e.g., The Marine Mammal Center, which is based in California, has established a monk seal hospital on the big island for rescue and rehabilitation).
- The monk seal recovery plan is one of the more 'insular' ones. It is sometimes a challenge to convince/encourage other agencies (state and federal) to do the work 'assigned' to them in the recovery plan. There is no joint mandate for management of monk seals as there is for sea turtles, which can result in 1) other agencies seeing action(s) as NOAA's 'problem' (sole responsibility), and/or 2) other agencies putting monk seal actions lower on the priority list than NOAA would like to see them, and/or 3) other agencies seeking funding from NOAA's budget to undertake the actions 'assigned' to their agency. Other contributing factors – Hawaii is an isolated state, doesn't share border with other states.

| Hawaiian monk seal | |
|---|---|
| Total recovery actions | 109 |
| Actions that are ongoing and current | 65 |
| Actions that are ongoing, not current | 13 |
| Actions not started | 2 |
| Partially complete actions | 2 |
| Obsolete or discontinued | 15 |
| Complete actions | 12 |

***Middle Columbia River, Washington Gorge Unit steelhead trout***

Factors contributing to the successful implementation recovery actions discussed in the interview:

- The team that coordinates the recovery actions has worked together for many years and they have developed the social capital to be an effective recovery team.
- There is a great deal of local support for the recovery actions that implement projects identified in local sub-basin plan projects.
- Recovery actions are being reassessed and reprioritized in light of better information about limiting factors and recovery criteria.
- A steering committee has been established to reprioritize recovery actions.

- Recovery actions with funding from the Bonneville Power Administration are able to move forward.

Factors representing a challenge to the successful implementation of recovery actions discussed in the interview:

- The initial recovery actions were drawn from sub basin plans prepared by the Northwest Power and Conservation Council. These plans were developed to implement local projects with funds from the Bonneville Power Administration and many actions from the NPCC sub basin plans are not linked to Middle Columbia River steelhead trout limiting factors or criteria for recovery.
- Some recovery actions depend on cooperation among government entities, and disagreements among those entities delay implementation of the action.
- Initially, limiting factors for steelhead trout were generated using simulation models. Limiting factors for the Washington Gorge Unit have not been assessed, and need to be assessed properly in order to prioritize the most effective actions.
- Funding for ongoing monitoring actions is difficult to maintain.
- Actions sometimes precede a thorough assessment.
- Too many recovery actions are intended to fix problems that don't exist or are unlikely to have a direct effect on limiting factors or recovery criteria for steelhead Trout.
- With sequenced actions, the first action was completed before the party responsible for the second action was identified, funded, and prepared to implement the next action.

| Middle Columbia River (Washington Gorge Unit) steelhead trout | |
|---|---|
| Total recovery actions | 196 |
| Actions that are ongoing and current | 168 |
| Actions not started | 26 |
| Complete actions | 2 |

***North Atlantic right whale***

Factors contributing to the successful implementation recovery actions discussed in the interview:

- Recovery actions relating to vessel strikes and perhaps, to a degree, fishing gear modifications appear to have reversed the decline of right whales and this has allowed a gradual increase in their numbers for several years. With the development of better monitoring efforts including telemetric tags and passive acoustics, continued improvements in reducing mortality from human interactions may become possible.
- Good collaboration among NMFS Office of Protected Resources, various participating agencies and organizations, and the inclusion of responsible parties from shipping and fishing industries in discussions throughout the process has contributed greatly to these results. Ongoing reviews of recovery actions and adjusting priorities where needed has also improved the program's ability to better evaluate right whale behavior and distribution.

Factors representing a challenge to the successful implementation of recovery actions discussed in the interview:

- Information on the distribution and movements of right whales in the Atlantic is incomplete, complicating efforts to count them. The location of their whelping areas and feeding sites are but partially unknown.
- Up to the present, attempts to use telemetric tags on right whales to track their movements had to be stopped because the tags caused large areas of tissue to atrophy.
- Marine vessel traffic and fishing activity along the U.S. coast and western Atlantic is ubiquitous, making reductions, rather than the elimination of human interactions with right whales the goal.
- Critical aspects of right whale behavior are still unknown; yet studies to evaluate such behavior could be high risk to right whales, researchers, or both.

| North Atlantic right whale | |
|---|---|
| Total recovery actions | 134 |
| Actions that are ongoing and current | 115 |
| Actions that are ongoing, not current | 10 |
| Actions not started | 0 |
| Complete actions | 9 |

***Smalltooth sawfish***

The smalltooth sawfish is a data poor species. When the original plan was written, old records and anecdotal data were all that was available. Recent technology developments and better data should help the recovery team to identify more realistic and measurable outcomes that are indicative of recovery successes. NMFS is currently working on revising the recovery plan.

Factors contributing to the successful implementation recovery actions discussed in the interview:

- Part of the success of this particular recovery program is that it has a great recovery team.
- There is an annual implementation meeting that provides updates on research, discussions on work priorities, budget issues and the allocation of funds for priority actions.
- The implementation of this recovery plan is due to a great group of researchers that work well together.
- A little bit of money from NMFS has garnered a lot of collaboration from partners.
- The State of Florida is doing independent monitoring for all species, and NMFS gets data from that (piggybacks that work).
- Where possible, benefits are achieved due to overlaps with other projects.
- When the Habitat staff members go out on project sites, they provide the Protected Resources staff considerable feedback.
- When critical habitat was identified, there was some coordination with other Federal agencies, especially with regards to the crocodile.
- Coordination with other Federal agencies is mostly through section 7 consultations, the Everglades Restoration Project, and some overlapping plans.
- With the listing of all sawfish species, opportunities to work with bordering countries (*e.g.*, Bahamas, Cuba and Mexico) have been enhanced.
- NMFS Protected Resources staff has done an excellent job of steering the recovery of the smalltooth sawfish in the right direction.

- NMFS is considering a contract to help update the plan.

Factors representing a challenge to the successful implementation of recovery actions discussed in the interview:

- The greatest challenges are (inconsistent and insufficient) funding and the need to update the recovery plan with meaningful and measurable outcomes.
- Research capabilities have been limited. Approval under section 10 permitting to allow internal tagging for satellite tracking was received recently. Presently, one of three section 10 permits allow for internal tagging.
- When the original, first plan was written, there was hardly any data, so it was hard to identify what would be a good recovery action. NMFS is currently working on revising the recovery plan.
- Only three research permits are in place. The researchers can allow other people to work under their permits, for instance, some genetics work is done in NC by non-team members, but not a lot of work is done this way.
- NMFS does coordinate with the Army Corps of Engineers, National Park Service, and the FWS National Wildlife Refuges. In the Ten Thousand Islands – NMFS reviews park plans through section7 consultations. They coordinate and discuss any issues that may affect species recovery. Coordination with other Federal agencies can likely be enhanced.
- Studies are underway to evaluate the impact of discharges from Lake Okeechobee into the Caloosahatchee River, which is a main nursery area. These studies may need to be carried out in additional areas.
- When you are writing a recovery plan for the first time and don't have a lot of information--an action that sounds good turns out to be unrealistic or new information comes along that can change your focus. Some existing actions in the original plan were accomplished; however, some no longer make sense.
- New recovery guidance now focuses on using measurable criteria. Now actions must be linked to the recovery criteria. Some of the actions in the current plan no longer seem appropriate because they were not viable from the beginning or need to be updated because of more reliable information.

| Smalltooth sawfish | |
|---|---|
| Total recovery actions | 87 |
| Actions that are ongoing and current | 51 |
| Actions that are ongoing, not current | 6 |
| Actions not started | 26 |
| Partially complete actions | 2 |
| Complete actions | 1 |

***Sperm whale***

Most of the large whales, including the sperm whale, *Physeter macrocephalus* (Linnaeus 1758), were listed under the precursor to the ESA, the Endangered Species Conservation Act of 1969, and remained on the list of threatened and endangered species after the passage of the ESA in 1973 (35 FR 18319, December 2, 1970). Although the original listing did not provide an explanation or analysis of the five threats factors, it is understood that the main reason for listing is that most populations were depleted by modern whaling. Commercial whaling for this species

ended in 1988 with the implementation of a moratorium against whaling by the International Whaling Commission (IWC), and while it is often assumed that the worldwide population of sperm whales has increased since the moratorium, there are insufficient data on population structure and abundance of inhabited ocean basins to accurately determine population trends. The recovery plan (NMFS 2010) found that the main direct threat to sperm whales was addressed by the IWC whaling moratorium, but several potential threats remain, including collisions with vessels, entanglement in fishing gear, reduced prey due to overfishing, habitat degradation, disturbance from anthropogenic noise, and the possibility of illegal or resumed legal whaling at biologically unsustainable rates.

Factors contributing to the successful implementation recovery actions discussed in the interview:

- Sperm whales appear to be doing very well worldwide, but global population estimates are lacking. The decision by the IWC to not hunt except for scientific purposes has allowed the sperm whale to make progress towards recovery.

Factors representing a challenge to the successful implementation of recovery actions discussed in the interview:

- The fact that sperm whales are present in all the world oceans makes it very difficult to quantify their population, determine the rate of breeding success or identify discreet genetic populations.
- All of the recovery actions implemented for the sperm whale were developed for an ideal world. In other words, they were developed without taking into account the available resources needed to complete the recovery actions or the political ramifications of that completion. For instance, success also depends on the cooperation of foreign governments.
- Delisting any species, including marine mammals gets very political. It also takes as much effort and many resources to delist a species, as it does to list one. Due to constraints on limited resources, the NMFS Office of Protected Resources has prioritized helping recover species that are close to extinction. When funds are available, more resources can target the work that needs to be completed to delist a species.

| Sperm whale | |
|---|---|
| Total recovery actions | 47 |
| Actions that are ongoing and current | 41 |
| Actions not started | 4 |
| Partially complete actions | 2 |
| Complete actions | 0 |

***Stellar sea lion western DPS***

The recovery plan was written for both the eastern and western DPS, and in 2013 the eastern DPS was delisted. Several of the completed recovery actions address only the eastern DPS (*e.g.*, initiate a status review, develop a post-delisting monitoring plan). It is confusing to have the DPS's combined in one recovery plan, and it remains that way now.

There are multiple recovery actions and related recovery criteria for the western DPS that are related to state fisheries that have either been only partially implemented or that have not been implemented at all. These include but are not limited to: monitor & evaluate incidental take in non-commercial fisheries (monitoring for entanglements); Prepare a habitat conservation plan under section 10 of the ESA for fisheries authorized by the State of Alaska; Consider and implement conservation measures in herring and salmon fisheries in Alaska as appropriate.

An agreement is established with the State of Alaska, which describes their fishery management plan, minimizes the take of Steller sea lions, and describes how future actions taken by the State will comport with the MMPA for the Eastern DPS but not for the Western DPS. Additionally, this doesn't not constitute a Habitat Conservation Plan (HCP), and therefore the detailed work to evaluate, mitigate, and monitor take in State fisheries has not been undertaken. It is a priority for NMFS to work with the State on development of an HCP and previously NMFS has indicated that funding may be available to develop one or more such plans.

Four actions are especially important to recovery:

1. Continue population monitoring and research on key threats to reduce and minimize uncertainty.
2. Maintain current (or equivalent) fishery conservation measures [Action 2.6.6].
3. Design and implement an adaptive management program to evaluate fishery conservation measures [Action 2.6.8].
4. Develop a Recovery Implementation Plan.

Factors contributing to the successful implementation recovery actions discussed in the interview:

- Historically, NMFS has had excellent funding for Steller sea lion research (and therefore good capacity and capability), but the future of funding is uncertain. There has been good collaboration between the agency and non-agency researchers, including government/private and federal/state relationships, and also between regions (AK/WA/OR). Partnerships can be strong on one action but not on another. For example, ADF&G is strong on research, but not on developing a Habitat Conservation Plan. NMFS works with Alaska Native co-managers and cooperators on issues related both to subsistence hunting and conservation of the species. Capacity within these organizations is increasing. Relationships with the co-management and cooperative Alaska Native entities are strong, in part because NMFS works closely with these partners to improve communication, build trust, consider native priorities, and to provide funding to build capacity, implement projects, and support the organization. Work plans and research are mutually agreed upon.
- The realities of a large and remote range, coupled with weather that is often harsh, pose challenges to full realization of research and monitoring goals. Significant factors influencing whether management actions could be successfully implemented included whether or not NMFS could take action directly and competing organizational priorities.

Factors representing a challenge to the successful implementation of recovery actions discussed in the interview:

- There is only one NMFS person devoted to the SSL recovery plan, but a whole program is needed because there is so much interaction and so many recovery actions. This challenge is not just about funding, but also about staffing, staff freedom to set priorities, and predictably knowing what resources are available in the long-term.
- The ability to monitor threats, research, and status holistically on a landscape scale with GIS support would be helpful, but there current GIS staff support for Steller sea lion recovery actions are limited. A spatial tool would allow for better planning, viewing trends, status review, integration of actions & research, and could track cumulative impacts geographically.
- A Recovery Implementation Plan has not been developed for western Steller sea lions. A Recovery Implementation Plan would produce a flowchart, greater prioritization, and a more focused, stepped-down plan for recovery actions. This would require NMFS staff time and needs to be a high priority for the near future if NMFS is to improve recovery implementation, focus, and outcome.
-

| Steller sea lion | |
|---|---|
| Total recovery actions | 82 |
| Actions that are ongoing and current | 70 |
| Actions not started | 10 |
| Complete actions | 2 |

***White abalone***

Factors contributing to the successful implementation recovery actions discussed in the interview:

- Some of the habitat concerns within U.S. jurisdiction have been addressed by several Marine Protected Areas, but coastal development and factors that affect water and kelp quality (e.g., oil spills, increases in sea surface temperature due to long- and short-term climate events) can lead to less resilient kelp forests. The restoration of kelp forest and the reintroduction of abalone to them in some coastal areas may help stabilize and protect these habitats in the face of future threats.
- The focus has now shifted on to captive propagation of this species for future out-planting. These projects are succeeding with thousands of animals in the growth process.
- The wild population estimate on one offshore bank that has been monitored since 2002 has declined by 75%. Evidence of a few wild animals along the Southern California coast in areas where white abalone have not been seen for 20 years confirms that continued and more expansive monitoring of wild populations in necessary in order to accurately portray the species status. Although the prediction of extinction by 2010 was incorrect, populations in the wild are still critically endangered, with very little or no evidence of reproduction happening throughout most of the species range.
- Recovery actions are being addressed as funds and staff allow.
- Recovery actions for other species of abalone are providing additional relevant information for the species and its recovery efforts.

Factors representing a challenge to the successful implementation of recovery actions discussed in the interview:

- Data sharing with public and private entities that view work products as intellectual property. Delays in providing this information slow the process.
- Some recovery actions depend on cooperation among government entities and foreign governments. Disagreements among those entities delay implementation of the actions.
- Funding is always an issue of priority.
- Scientific support for special genetic and modeling actions is intermittent.
- The captive propagation project is planned to out-plant animals after they are five years old to help ensure greater survivability.
- The capacity needed to grow the animals until they reach that age is an impending problem.

| White Abalone | |
|---|---|
| Total recovery actions | 47 |
| Actions that are ongoing and current | 38 |
| Actions not started | 7 |
| Complete actions | 2 |